Precision Cooling for
Business-Critical Continuity™

Liebert HPM Digital

Improved Performance to Boost Efficiency

EMERSON
Network Power

Emerson Network Power, a division of Emerson Electric Co., is a global company that combines technology with design to supply innovative solutions for the benefit of its customers.
Emerson Network Power is the leader in the "***business-critical continuity***" field, thanks to the company's products and services.
Emerson Network Power's broad technology base and global expertise supports a full spectrum of enterprise-wide solutions for today's vital business needs.

Regardless of your size, you can't afford for your critical business systems to go down and you can't waste time recovering your IT infrastructure after a disruption.

Leave that to us, the experts in *business-critical continuity*: from grid to chip, from the biggest to the smallest data centers, we are ready to serve your needs with the solutions we have developed.

More standardization, so you don't need further budget allocations to install it.
More simplification so you don't need to be a specialist to get the best for your business.
More support, so while you are enjoying doing business, we are protecting you.

That's why we can say we OptimizeIT!

optimizeIT™
Infrastructure Simplified.
Support Unparalleled.

Liebert HPM Digital offers a cooling solution with all the best technologies in the market.

Liebert HPM Digital the Superior Cooling Technology

The advanced and continuously evolving IT market, is one of the fastest growing high tech industries.
Data center cooling needs the most sophisticated ambient control, to keep very precise room conditions, limit the energy consumption and enhance the performances of customers' electronic equipment.

Liebert HPM Digital is an air conditioner cabinet, equipped with the top industry technologies, for the most precise cooling of data centers and server rooms.

Key Features:

- Digital Scroll: provides capacity modulation.
- iCOM control and integrated Ethernet connections, to ensure top reliability in all conditions.
- EC Fan - Electronic Commutated Fan and EXV - Electronic Expansion Valve are available to provide the highest energy saving effect.

Liebert HPM Digital: Adaptability For Your Business

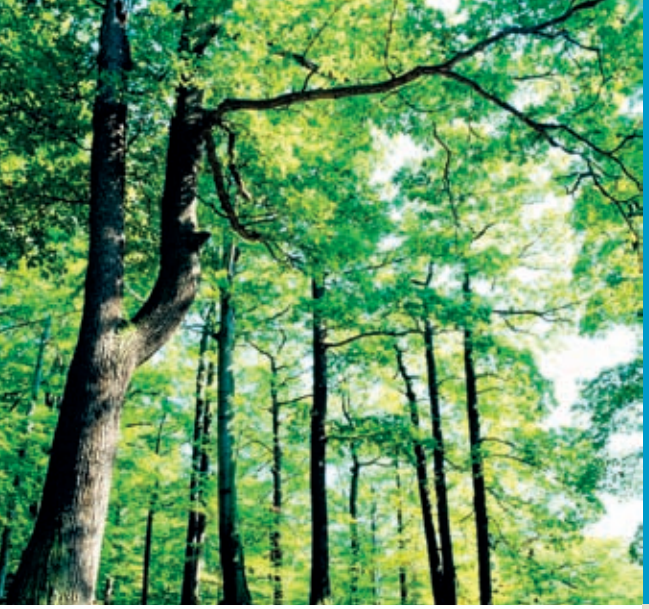
Liebert HPM digital is the ideal solution for those customers looking for a scalable system that can grow with their business: a 50kW unit can be used as if it were a 10kW unit thanks to the digital scroll modulation capabilities that range from 20% to 100%.

Liebert HPM Digital High Efficiency Version: The Best For Your Business!

In addition to the benefits of the basic version, Liebert HPM digital EXV is the ideal solution for customers looking for the lowest operating costs: their infrastructure will be working in the optimum environmental conditions.

Liebert HPM Digital a building block of Smart Aisle™:

a complete solution to address all customers' needs, minimizing the entire Data Center consumption.



Liebert HPM with Copeland Digital Scroll and Alco Electronic Expansion Valve: Emerson Network Power cooling solution to achieve the highest efficiency for a direct expansion application.

Copeland Digital Scroll™ is an exclusive of Emerson Network Power in Data Center cooling.

Liebert HPM Digital: Offers More, Requires Less

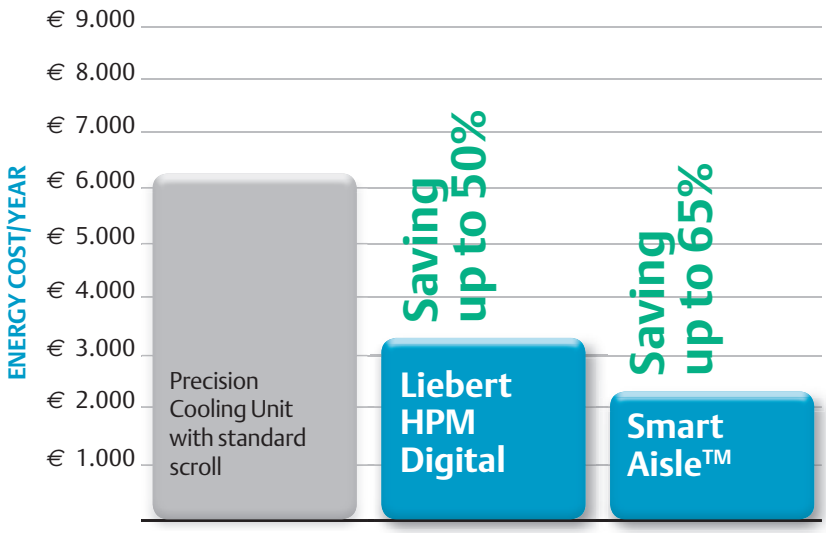
Key Benefits Offered By Liebert HPM Digital Scroll:

- Secure your IT investment: with Digital Scroll achieve more performance at a greater value for money, reducing energy demand.
- Just-in-time cooling: Digital Scroll delivers adaptive cooling depending on the heat load to always keep the precise temperature level required.
- Scalability and efficiency: endless balance. Increasing dimension of your data center or higher density will not force you to invest further: the unit can in fact adapt its performance accordingly as your data center grows.
- Unique technology, for competitive advantages without comparison: never ending protection for the IT infrastructure with energy saving maximized.

Saving up to 65%

Example: A 20kW Unit Working At 80% Of Heat Load.

Annual Saving for Liebert HPM Digital System fitted with all the most advanced technologies in the market (Digital Scroll Compressor, Electronic Expansion Valve, EC Fan) with and without cold aisle containment compared to standard Precision Cooling unit fitted with standard scroll.



Datacenter Set Point: 24°C– 50 rH%
Energy Cost: 0,12/kWh

+ **EC Fan Effect** Higher Motor Efficiency
+ **EXV Effect** Lowest Condensing Temperature & Better use of Evaporator
+ **Humidifier Effect** SHR=1 means No Need to Run Humidifier
+ **COP & SHR Effect** Liebert HPM Digital has Higher COP & SHR at modulated capacity

+ **Smart Aisle™ Effect** Through the patent software Liebert HPM Digital modulates fan speed and cooling capacity in order to match the required airflow at the needed temperature to perfectly satisfy the servers' needs, without wasting any single Watt.

Digital Scroll Technology: achieves more performance at a greater value for money, reducing energy cost.

Key Advantages of Digital

- **Modulation**
  Liebert HPM Digital works at very different partial loads without the use of an external Inverter. Thanks to its unique technological solution, **Digital Scroll immediately reacts to every change in load requirements. Its modulation is achieved through mechanical actions, so Digital Scroll is completely free of electromagnetic interference.**

- **The Capacity Needed, Every Time**
  Liebert HPM Digital perfectly follows site needs, which means that it doesn't waste any energy once the cooling requirement is met. Another important advantage is that, **at partial load, a Digital Scroll doesn't work with ON - OFF configuration. This avoids peaks in adsorbed power, and reduces stress on components. This increases the life of the unit, greatly reducing failure due to fatigue.**
  Liebert HPM Digital has a very high precision on temperature control; in fact, by perfectly coupling its capacity to the heat load, the control is always able to keep an extremely constant temperature.

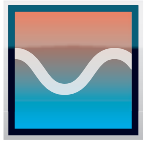
Liebert HPM Digital

Optimized for R410A Refrigerant

Copeland Digital Scroll Technology the best solution in terms of variable cooling capacity

EC Fan to optimize the air flow distribution

Top Class Energy Efficient thanks to the Best Technologies in the market



Perfect capability to follow the heat load without wasting any single kW in not required cooling

Room Temperature always under extremely precise control thanks to Digital solution

Whenever you need support Emerson Network Power is there for you

Liebert HPM Digital Application Scenarios

Liebert HPM Digital Downflow

Downflow units are used when a raised floor is present and available for air distribution. This is the most common case on Data Center applications. Liebert HPM Digital optimizes all such applications offering the highest efficiency, thanks to the cooling modulation which always allows to perfectly follow IT Load requirements.

Suitable for:
- Raised Floor Application
- Smart Aisle™ Application

Liebert HPM Digital Upflow

Upflow units are meant to be used on those applications having the air distribution from the top, with or without the presence of ducting system. The presence of an EC Fan as standard on Liebert HPM Digital means that this unit can give the highest External Static Pressure (ESP) whilst limiting power input. So Liebert HPM Digital can optimize cooling requirements, at the same time giving the most suitable airflow and ESP in order to fulfil all the site's different needs.

Suitable for:
- Ducted Application
- Application without raised floor or with raised floor not suitable for air distribution
- Technical rooms

Liebert HPM Digital Displacement

Displacement units take their name from the Displacement effect. It consists on creation of stratification of cold air on the bottom part of the room, and hot air on the top. This is done delivering cooled air at very low speed. Displacement effect gives a good contribution to system efficiency. Liebert HPM Digital Displacement is the perfect unit for small applications where scalability and growing capacity are key points.

Suitable for:
- Application without raised floor
- Technical rooms
- Small Data Rooms with cooling unit in front of the racks

Liebert HPM Digital Cooling Versions

Liebert HPM Digital Air Cooled

Air cooled direct expansion solution optimizes condensing temperature in the simplest installation configuration and with minimum impact on the site, avoiding to have water inside the Data Center.
Liebert HPM Digital Air Cooled is the right solution to optimize all these applications.

Liebert HPM Digital Water Cooled

It is the perfect way to exploit all digital benefits for all those applications where Air Cooled solution is not applicable due to specific site limitation: i.e. long distances between internal and external unit, big geodetic height difference.

Liebert HPM Digital Dual Fluid Air Cooled

It's the right answer for all those applications where Chilled Water is the primary cooling source, but it is not constantly available (i.e. alternative usage between Air Conditioning and Precision Cooling); in fact, it offers a top efficient direct expansion solution that works as redundant cooling for the chilled water coil.

Liebert HPM Digital Dual Fluid Water Cooled

Suitable for applications where site limitations don't allow having air cooled solution.
This cooling configuration perfectly adapts to whatever site layout, therefore chillers and dry coolers can be placed wherever the site requires.

Liebert HPM Digital Freecooling

For all those applications where efficiency is a top driver, Liebert HPM Digital offers the possibility to exploit for the longest period the Freecooling effect, thanks to Digital capacity modulation. Furthermore even when the external conditions don't allow to exploit Freecooling, Liebert HPM Digital grantees a top efficiency,
also in pure DX mode.

SmartAisle™: Emerson Network Power Solution

1

Smart Aisle™ cold aisle containment

Physical separation of cold and warm air zones using Knürr CoolFlex® technology. Cold Aisle Containment ensures that the cold air distributed through the raised floor is delivered directly to IT cabinets.

2

iCOM with SmartAisle Control Logic

A cooling unit with SmartAisle control logic ensures the proper airflow, air temperature and humidity required by IT equipment. Dynamic fan speed and cooling capacity control provides maximum cooling efficiency.

3

Liebert HPM

Liebert HPM Digital, thanks to the continuous modulation of a digital scroll Compressor, delivers the air exactly at the temperature required by the server, and an EC Fan delivers exactly the airflow taken by them. This prevents any single kW of power input not required for cooling being wasted. When the system includes the Alco Electronic Expansion Valve the full system can maximize its efficiency, reducing the condensing temperature during the coldest season without scarifying SHR as happens with units with a standard scroll.

	Standard unit Traditional Approach	Digital Unit Traditional Approach	With Cold Aisle Containment	With SmartAisle
Compressor	61.1%	35.4%	30.3%	27.2%
Condenser	4.9%	4.9%	4.9%	4.9%
Evaporator Fan	18.6%	9.7%	6.8%	2.1%
Humidifier	15.4%	1.2%	1.2%	1.2%
Total	**100%**	51.2%	43.2%	35.4%
Total Saving		**Saving 48.8%**	**Saving 56.8%**	**Saving 64.6%**

SmartAisle *solution can offer up to 65% saving compared to a standard cooling unit with common technologies, thanks to intelligent control of Digital Scroll Compressor capacity and accurate fan speed management, driven by cold aisle conditions.*

4

Liebert HPA

Remote air cooled condenser for precision room cooling units equipped with variable fan speed control specifically developed for Digital Scroll solutions. This Energy Efficient Solution maximises the system efficiency reducing consumption all year long.

5

Knürr Racks

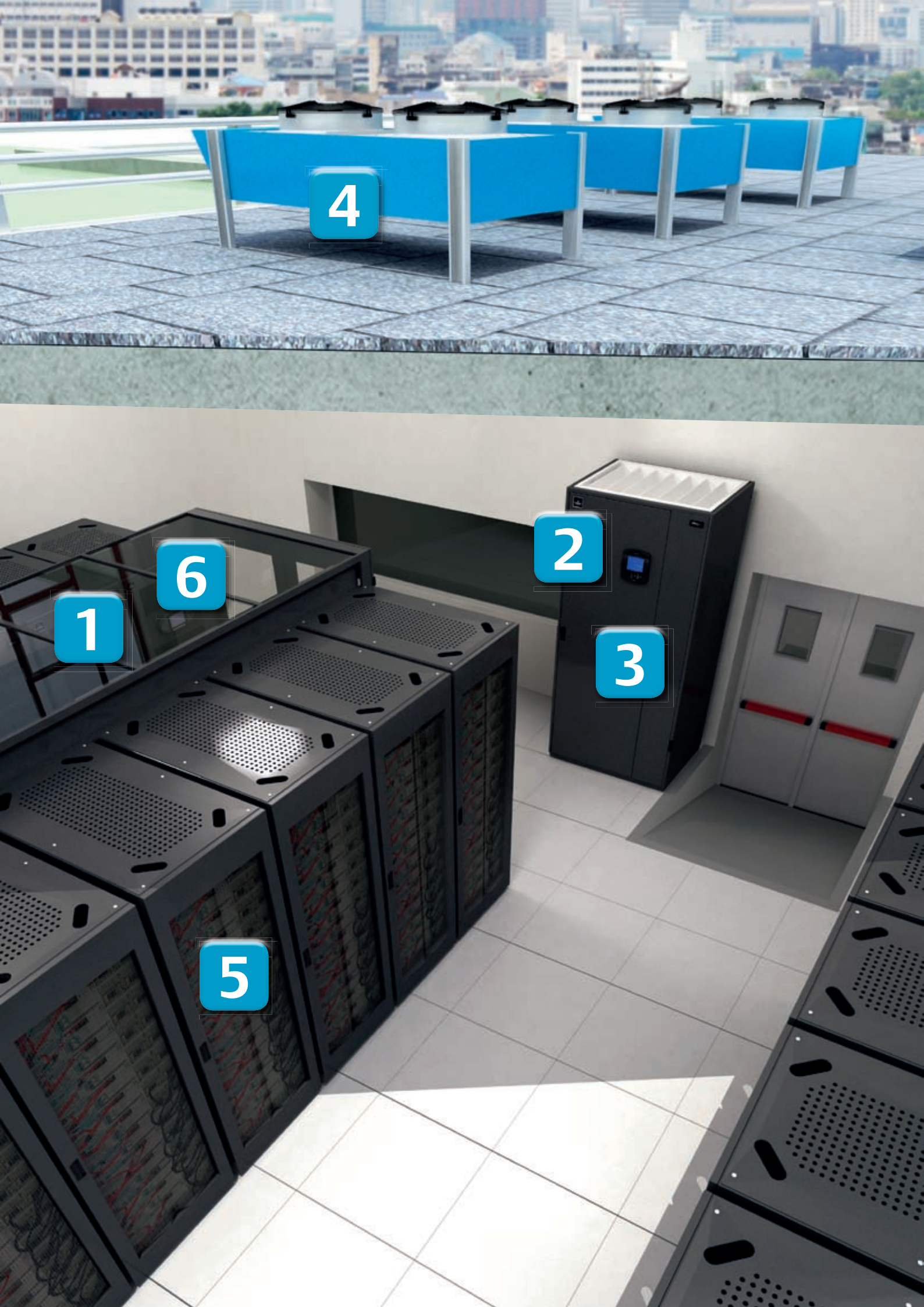
The Knurr server racks allow for flexible mounting of accessories, as well as a complete cable management system. The server rails guarantee easy mounting of all types of 19" servers and Liebert /Knurr accessories.

6

SmartAisle Equipment

The SmartAisle solution also incorporates additional improvements in cooling efficiency which can be achieved using the following equipment:

- Cable entry sealing systems
- Cabinet sealing with trims and blanking panels
- High Air Flow Perforated Floor Tiles with perforation up to 85%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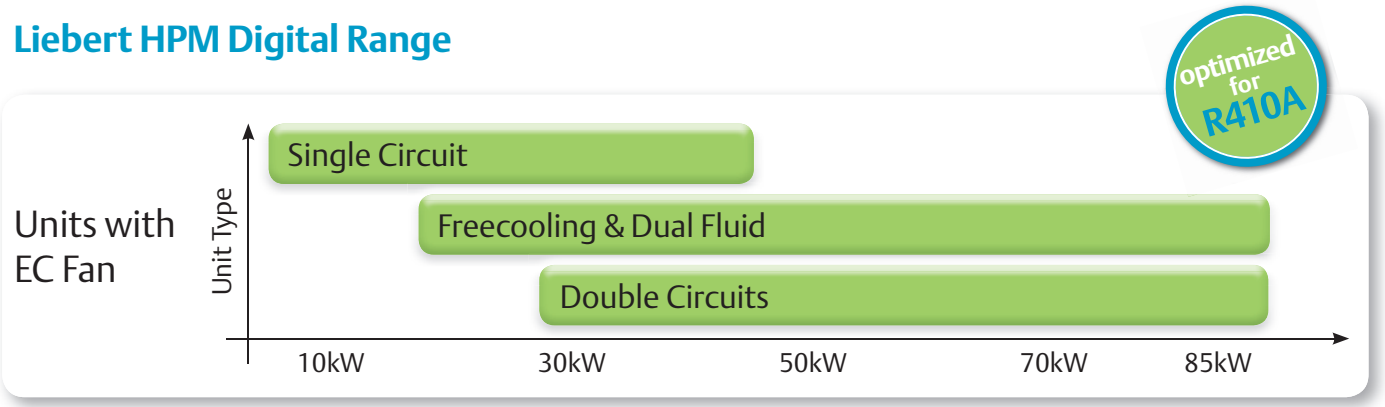
Liebert HPM Digital Range and Performance

Liebert HPM Digital Range



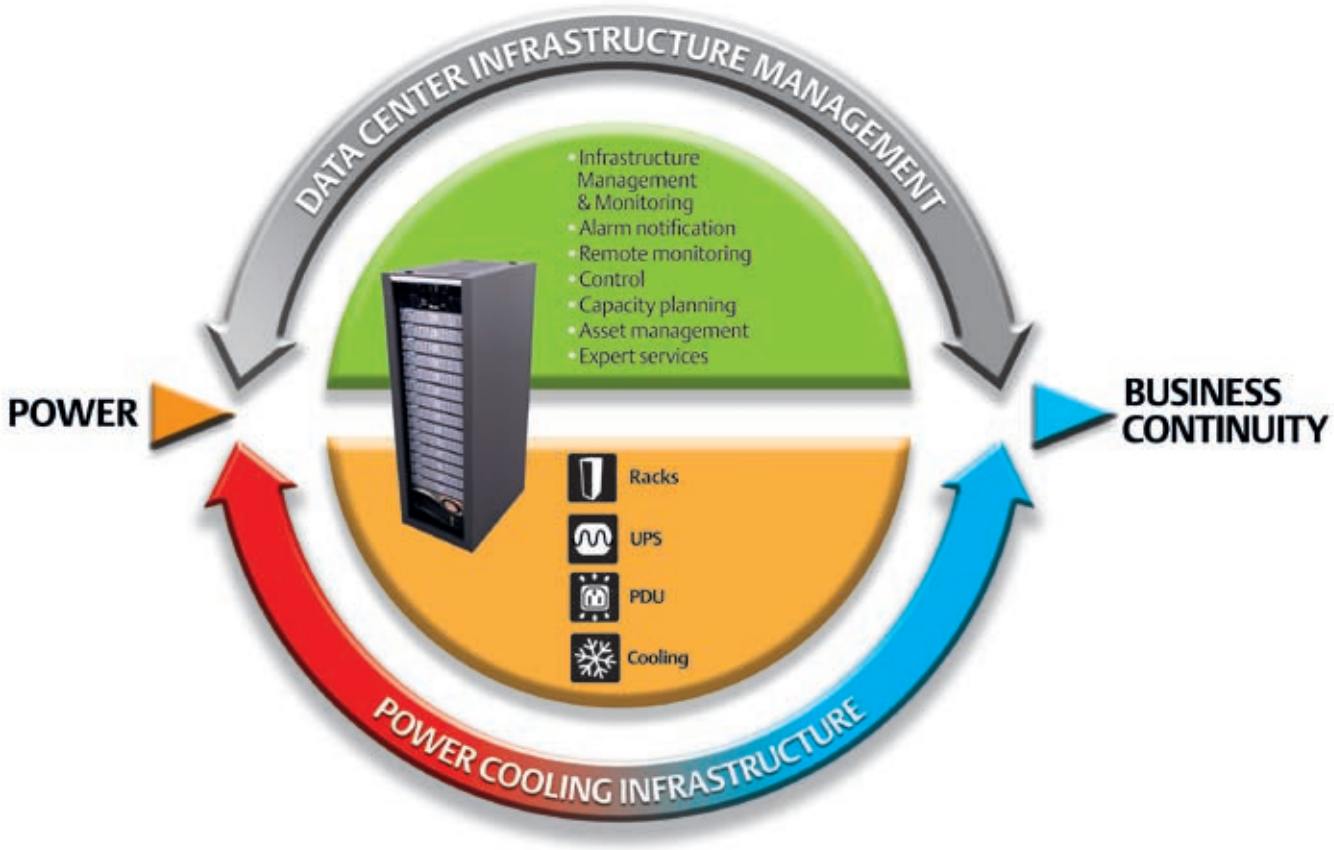
Liebert HPM Digital Performance

		Single Circuit						Double Circuits				
Room Unit Model		**D1E**	**D1G**	**D2E**	**D3A**	**D3G**	**D4E**	**D3F**	**D4H**	**D5D**	**D7L**	**D8F**
Condenser Model		HCR24	HCR24	HCR43	HCR43	HCR43	HCR59	2xHCR24	2xHCR33	2xHCR43	2xHCR43	2xHCR51
Total Gross cooling capacity	kW	15,8	17,4	23,9	29,0	34,9	44,1	36,3	45,1	58,4	65,2	81,3
Net Sensible cooling capacity	kW	13,9	15,9	20,5	25,2	33,0	40,4	34,0	41,5	49,4	53,4	71,0
SHR at Full load		0,92	0,95	0,92	0,92	0,98	0,96	0,97	0,96	0,90	0,87	0,93
SHR at 80% load		1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	0,95	1,00
Net Sensible EER at full load		3,2	3,1	3,0	3,1	3,4	3,2	3,4	3,2	3,0	2,8	2,7
Net Sensible EER at 80% load		3,4	3,2	3,1	3,1	3,4	3,2	3,6	3,4	3,2	3,1	2,8
Airflow	m3/h	4.200	4.930	5.750	7.080	9.540	11.230	9.490	11.370	12.910	13.470	20.020
Max. ESP	Pa	400	380	190	200	400	320	400	310	200	150	120
Sound pressure level at 2 meters in f.f. conditions	dB(A)	48,8	49,2	50,0	55,4	55,8	57,4	56,0	58,3	58,7	58,5	67,4
Minimum Net Sensible Capacity during modulation	kW	3,2	4,1	5,1	6,2	8,6	9,9	3,5	4,2	4,8	5,3	6,8
Internal Unit Dimensions (W x D)	mm	750x750	750x750	750x750	1000x850	1750x850	1750x850	1750x850	1750x850	1750x850	1750x850	2550x890
Exteranl Unit Dimensions (W x D)	mm	1112x1340	1112x1340	1112x1340	1112x2340	1112x2340	1112x2340	2x (1112x1340)	2x (1112x1340)	2x (1112x2340)	2x (1112x2340)	2x (1112x2340)
Weight Internal Unit	kg	240	250	270	415	570	600	580	585	620	645	950
Weight External Unit	kg	75	75	92	92	92	102	2x75	2x80	2x92	2x92	2x93
Aiflow Delivery (Down Flow, Up Flow, Displacement/Frontal)		D,U,F	D,U,F	D,U,F	D,U,F	D,U	D,U	D,U	D,U	D,U	D,U	D

"Performances at 24°C 50%
Nominal ESP 20 Pa
External Temperature 35°C
System able to work up to 40°C external temperature with condenser models as shown; higher ambient operating temperatures available with alternative condenser selections.
Internal Unit Height 1950mm; External Unit Height 907mm"

In Data Center applications the load is represented by sensible heating sources, which means that what a Precision Cooling unit is really required to give is a **Net Sensible Capacity.**
As clearly shown on the table above, Liebert HPM Digital at partial load increases both its SHR and its Net Sensible Efficiency (the ratio between Net Sensible Capacity and unit power input, providing a real measurement of **unit efficiency**).
Liebert HPM Digital is,therefore, the optimized solution to handle Data Center cooling, giving additional benefits thanks to its unique characteristic of addressing directly the sensible load given by the servers.

Emerson Network Power Business-Critical Continuity™ Expert



Today's successful businesses depend on adaptable technologies to help them respond quickly to market demands. Your data center must be built on a support infrastructure designed to match the power and cooling needs of rapidly changing IT initiatives such as virtualization and consolidation. Each IT change, move or addition will affect the entire support infrastructure so you need products and support that ensure your IT systems will operate reliably in these environments.


More than 35,000 organizations in 70 countries depend
on our Business - Critical Continuity ™ Promise:
your IT infrastructure stays up to support your Business!

Ensuring The High Availability Of Mission-Critical Data And Applications.

Emerson Network Power, a business of Emerson (NYSE:EMR), is the global leader in enabling *Business-Critical Continuity™* from grid to chip for telecommunication networks, data centers, health care and industrial facilities. Emerson Network Power provides innovative solutions and expertise in areas including AC and DC power and precision cooling systems, embedded computing and power, integrated racks and enclosures, power switching and controls, infrastructure management, and connectivity. All solutions are supported globally by local Emerson Network Power service technicians. Liebert AC power, precision cooling and monitoring products and services from Emerson Network Power deliver Efficiency Without Compromise™ by helping customers optimize their data center infrastructure to reduce costs and deliver high availability.
For more information, visit:
www.Liebert.com, www.EmersonNetworkPower.com
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Emerson Network Power SrL- ISO 9001:2008.
Design, manufacturing, assembling and sales of chilled water mixture and equipment for high precision air conditioning. Sales of small uninterruptible power supply (UPS Small and Micro)

Emerson Network Power SrL-ISO 14001:2004:
Design, manufacturing, assembling and sales of chilled water mixture and equipment for high precision air conditioning. Sales of uninterruptible power supply (UPS Power). Design of uninterruptible power supply (UPS Power). Sales of small uninterruptible power supply (UPS Small and Micro). HQ Service Activities (Spare parts warehouse, Technicians training)

Emerson Network Power
The global leader in enabling Business-Critical Continuity™

- AC Power
- Connectivity
- DC Power
- Embedded Computing
- Embedded Power
- Infrastructure Management & Monitoring
- Outside Plant
- Power Switching & Controls
- Precision Cooling
- Racks & Integrated Cabinets
- Services
- Surge Protection